



JN1U42.001AUS

PATENT

**Method for Manufacturing Homeotropic Alignment Liquid Crystal Film,  
Homeotropic Alignment Liquid Crystalline Composition and Homeotropic  
Alignment Liquid Crystal Film**

Background of the Invention

Field of the Invention

[0001] The present invention relates to a method for manufacturing a homeotropic alignment liquid crystal film. Moreover, the present invention relates to a homeotropic alignment liquid crystalline composition and a method for manufacturing a homeotropic alignment liquid crystal film using the homeotropic alignment liquid crystalline composition. Furthermore, the present invention relates to a homeotropic alignment liquid crystal film and an optical film obtained by the above-mentioned manufacturing method. Moreover, the present invention relates to a visual display, such as a liquid crystal display, an organic EL display, a PDP (plasma display panel), etc., using the above-mentioned optical film. A homeotropic alignment liquid crystal film may be used as a retardation film, a viewing angle compensating film, an optical compensating film, and an elliptical polarization film independently or in combination with other optical films.

Description of the Related Art

[0002] Homeotropic alignment of a liquid crystal compound is obtained when the major axis of a liquid crystal phase molecule in a thin film substrate is generally substantially vertical to the film plane. Since substances that spontaneously provide homeotropic alignment are hardly known, a vertical alignment agent is generally used in order to obtain such alignment. For example, nematic liquid crystal compound is an example of a liquid crystal compound that can provide homeotropic alignment by using a vertical alignment agent. Such an outline in connection with an alignment technology of liquid crystal compound is discussed in Chemical Review 44 (Surface Reforming, edited by Chemical Society of Japan, pages 156-163).

[0003] Various kinds of organic or inorganic alignment agents are known as vertical alignment agents to homeotropically align the above-mentioned liquid crystal

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5/19/2004